Software Engineering Institute

CMMI Roadmaps

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Abstract

CMMI "roadmaps"—which are a goal-driven approach to selecting and deploying relevant process areas from the CMMI-DEV model—can provide guidance and focus for effective CMMI adoption. The Dutch Software Process Improvement (SPIder) network convened a workshop in November 2006 to develop several CMMI roadmaps for the continuous representation, each with a specific set of improvement goals. These roadmaps combine the strengths of both the staged and the continuous representations.

1 Introduction

1.1 The Rationale for Roadmaps

CMMI uses two representations: staged and continuous. The staged representation is the most used representation, although the continuous representation is commonly perceived to be a more flexible option. Often, potential CMMI users do not select the continuous representation because they find it difficult to pick "the right set and order" of process areas for their situation. Potential users may then choose the staged representation because they don't know where to start in the continuous representation.

The staged representation could be considered a comprehensive roadmap for the continuous representation. This approach fits those organizations that want to systematically improve the capability of their development activities. The order of process areas (the selection of process areas that belong to a certain maturity level) is mainly determined by historical analysis of process problems in development organizations. Project management and commitment problems have typically prevented an efficacious development from taking place—which explains why maturity level 2 focuses on project-management-related process areas. Once these problems were resolved, companies needed to achieve economies of scale and align their processes for all projects at maturity level 3.

However, sometimes this approach is not the most beneficial. Organizations may have project management that functions reasonably well, but might still face many product defects. Other organizations may not develop software, hardware, or systems themselves, but integrate components from external suppliers instead. For these (and other) situations, the continuous representation offers the possibility of designing a customized roadmap as an alternative to the staged representation. To support companies in their selection of an appropriate sequence of process areas, we have developed several roadmaps for the continuous representation, each addressing a specific set of improvement goals. These roadmaps combine the strengths of both the staged and the continuous representations.

1.2 The History of Roadmaps

The first idea—that there are different roadmaps within the continuous representation—arose during a management workshop at the start of a CMMI implementation activity. This particular management team had difficulties in deciding which process areas to implement first. The consultant who facilitated this workshop asked, "What do you want to improve first: project quality, product quality, or process quality?" Everybody agreed on process quality.

This approach was discussed with a fellow CMMI expert, and this discussion led to the publication of an article about the concept of roadmaps in a leading IT journal in the Netherlands [Cannegieter 2006a], as well as a keynote presentation at the PROFES International Conference on Product Focused Process Improvement [Cannegieter 2006b]. Other CMMI consultants and experts had a positive reaction—many were interested and saw this concept as a contribution to the existing CMMI Product Suite.

To further elaborate on the roadmaps concept and to increase the support for roadmaps, the authors organized a workshop on 15 November 2006 in cooperation with the Dutch SPI network (SPIder). Thirty-five CMMI practitioners from The Netherlands and Belgium attended this workshop. In small groups, they developed the roadmaps described in this report. The attendees of this workshop are listed in the appendix.

The outcomes of this workshop led to this technical note. It has been reviewed by the workshop attendees and the SEI, whose review led to further refinements. This technical note is a contribution of the Dutch SPI community to the international SPI community.

2 Use of the Roadmaps

2.1 Roadmaps in an Improvement Project

The roadmaps in this report are primarily intended for organizations that are starting a CMMI for Development implementation, deciding to use the continuous representation, and needing help in deciding what process areas to implement first.

An improvement project starts with the recognition by the management of an organization that improvements are needed. These reasons need to be clear, understood, and widely accepted within the organization. In the IDEAL model, this phase is described as the *Initiate* phase.

To achieve a shared understanding of the current situation, an analysis can help. A CMMI appraisal is one way to analyze the current situation, but the use of an appraisal implies the selection and use of a particular CMMI constellation, which may be premature for some organizations. Other ways to analyze the current situation include evaluations of projects or processes, customer satisfaction investigations, causal analysis of defects, benchmarks, or audits. In the IDEAL model, this phase is described as the *Diagnose* phase.

After the analysis of the current situation, the goals of the improvement project and the problems that have to be solved must be clear, understood, and widely accepted. If the goals fall within the scope of a CMMI constellation, that constellation can be used as a reference model for the improvement project. At this point, the organization needs to select which representation to use—a choice that is determined by business, cultural, and legacy factors [SEI 2006].

When an organization decides to use the continuous representation, it needs to determine which process areas to implement first. To achieve this goal, one needs to understand the architecture of CMMI, the content of the process areas, and the relationships among the process areas, which can be difficult for organizations that have no experience with CMMI. In practice, this can lead to three situations:

1. An experienced consultant advises an organization about the implementation sequence. One drawback to this is a lack of ownership for this decision within the organization itself and a dependency on the consultant.

2. An improvement team from the organization studies the CMMI for Development model (or the CMMI for Acquisition model or the CMMI for Services model) and its process areas in detail. One advantage is that the organization develops a better understanding of CMMI. One drawback, however, is that this process takes a lot of time, which could instead be spent on improving processes. Another possible drawback is that the choices made may not fit the goals and problems of the organization.

3. The organization selects the Staged representation. One drawback of this approach is that the selected process areas may not represent the most direct approach to addressing the improvement goals.

CMMI model roadmaps are tools to aid organizations that want to use the continuous representation. The roadmaps help those organizations select which process areas to implement first, based

on the improvement goals and problems that the organization wants to solve. At the same time, organizations that choose to use roadmaps can be more confident that they have selected an appropriate set of process areas to address their initial needs.

The focus of this report will also be on CMMI for Development, though analogous roadmaps could be developed for the other constellations.

Five roadmaps are recognized at this point in time:

Project Roadmap	For organizations with project management-related goals or business problems
Product Roadmap	For organizations with product-related goals (e.g., for improved product quality) or business problems
Product Integration Roadmap	For organizations with product-assembling goals or business problems. Applicable when the primary challenge for projects is correctly integrating software components, hardware components, or both software and hardware components
Process Roadmap	For organizations with process management-related goals or business problems
Measurement Roadmap	For organizations with measurement-related goals or business problems

Each roadmap contains a limited set of four to eight process areas, which limits the scope and duration of the first improvement cycle(s) and helps organizations to focus their improvement activities on the critical few process areas that are most likely to provide direct benefit to their situation. Since each organization is unique, the improvement goals and problems to solve first are different for each organization.

After finishing its implementation of a roadmap, the organization will generally have enough experience with process improvement in general and with CMMI in particular to define the next steps themselves. However, hints are given to suggest likely follow-on process areas.

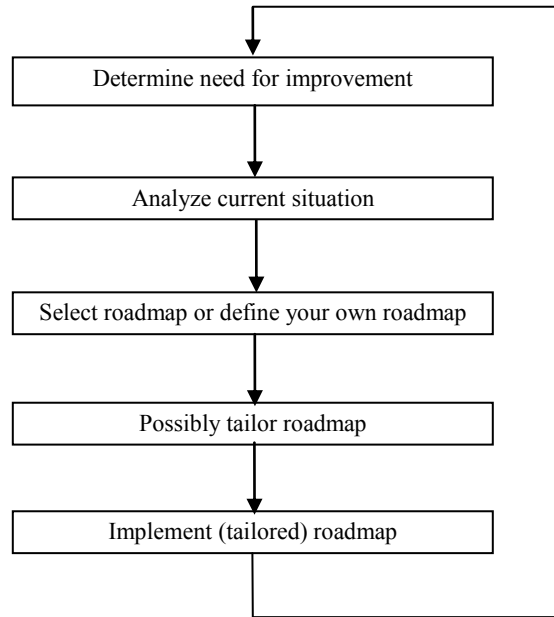Figure 1 provides an overview of how the roadmaps can be used.

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            │       │ Select roadmap or define your own roadmap │
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            │       │       Possibly tailor roadmap      │
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            │       │     Implement (tailored) roadmap   │
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Figure 1:   Using the Roadmaps

2.2 Structure of a Roadmap

Every roadmap has the same basic structure.

The first element of a roadmap is its *purpose*. The purpose characterizes the typical improvement goals addressed by this roadmap and the typical set of problems being solved.

The second element of a roadmap is its *potential users*. Some roadmaps are specifically applicable to certain types of organizations, and if this is the case, the applicable types of organizations are stated.

The third element of a roadmap presents the set of process areas that belong to that particular roadmap, as every roadmap contains a limited number of process areas. The rationale is that the first step in a process improvement project should never be too big. Process and Product Quality Assurance (PPQA) is almost always one of the included process areas, because without this process area, an organization can never be certain that a process is actually in use by the organization. PPQA may also be useful in identifying shortcomings in a new (or refined) process's definition, deployment, or implementation.

The next element, *rationale for inclusion or exclusion of process areas*, describes the motivation for selecting a particular set of process areas.

The last element in the roadmap structure is *possible next steps*. The roadmaps contain certain process areas, and after the first improvement cycle, an organization can identify its next improvement path by selecting another roadmap or by identifying its own additional set of process areas. In this section, some possible next steps are suggested.

3 Project Roadmap

3.1 Purpose

The purpose of the Project roadmap is to establish control of projects. Organizations choosing the Project roadmap typically want to

- be sure that each project meets its requirements
- improve the estimation of time and effort on projects
- improve the planning of projects
- improve the involvement of relevant stakeholders
- improve the monitoring and control of projects

This roadmap is meant for organizations that are having problems such as

- poor planning of projects
- no clear scope and requirements for projects
- limited involvement of relevant stakeholders in projects
- limited insight into the progress of projects
- projects that suffer continuous scope creep, budget overruns, or delayed end-dates

3.2 Potential Users

This roadmap is used by organizations whose business is generally carried out within projects. The success of these organizations depends heavily on their ability to control projects. Examples of such organizations are

- a software house that carries out projects for customers
- a software department of an organization that consists of projects such as developing software for in-house systems

3.3 Process Areas

To achieve the goals and resolve the problems described above, the following process areas should be implemented.

Project Planning
This process area will help establish and maintain plans that define project activities.

Project Monitoring & Control
This process area will help provide an understanding of a project's progress so that appropriate corrective actions can be taken if the project's performance deviates significantly from the plan.

Requirements Management
This process area will help manage the requirements of a project's products and product compo-

nents and identify inconsistencies between those requirements and the project's plans and work products.

Configuration Management
This process area will help establish and maintain the integrity of selected work products using configuration identification, configuration control, configuration status accounting, and configuration audits.

Process and Product Quality Assurance
This process area will help provide staff and management with objective insight into the processes being defined and deployed and associated work products.

3.4 Rationale for Inclusion or Exclusion of Process Areas

These five process areas provide for the basic control of projects. They help organizations plan and monitor projects, as well as ensure that the project focuses on the established requirements. The addition of the Process and Product Quality Assurance process area ensures that improved processes are used. This roadmap overlaps with a part of the process areas of 'staged' maturity level 2—addressing these project problems first has certainly been the main motivation of the authors of the Software CMM and of CMMI.

The Integrated Project Management and Risk Management process areas are not included in the roadmap because they are only effective when the Project Planning and Project Monitoring and Control process areas are implemented.

The Measurement and Analysis process area can be a good addition to this roadmap. It improves the measurement capability of the organization, which can help to improve project control. It is not included in the roadmap because the first priority of the roadmap is to achieve basic project control (including taking corrective action) before the measurement capability is improved.

If there are suppliers to a project, the Supplier Agreement Management process area can be a good addition to this roadmap.

3.5 Possible Next Steps

After finishing this roadmap, the organization may choose to implement one of the other roadmaps, depending on the problems and goals of the organization at that time. No other roadmap is inherently preferred to any other after the Project roadmap is implemented.

Another possible next step is implementing the Measurement and Analysis and Supplier Agreement Management process areas. When implementing these process areas, the organization not only improves its control over projects—it also reaches maturity level 2.

It is also possible to bring project control to a higher level by implementing the Integrated Project Management and Risk Management process areas. Rather than addressing these process areas in a way that introduces completely new processes, implementing these process areas should instead result in refinements to the definitions of the processes already introduced as part of the Project roadmap.

After having completed the Project roadmap, organizations can improve their measurement capabilities and quantitatively control their projects further by first implementing the Measurement and Analysis process area and then by implementing, with care, selected practices from the Quantitative Project Management process area.

Organizations can also define their own improvement path after finishing the Project roadmap by choosing process areas that best meet their improvement goals at that time. Furthermore, it is a good option to further improve the organization's implementation of the process areas in this roadmap by bringing the selected process areas to higher capability levels.

4   Product Roadmap

4.1 Purpose

The purpose of the Product roadmap is to effectively develop products that meet the needs of customers and to improve product quality. Organizations choosing the Product roadmap typically want to

- improve the quality of their products

- decrease the problems with products after release

- decrease time spent on building products by decreasing time spent on unrealistic or unwanted requirements, impractical or inferior designs, or ineffective implementations

- improve customer satisfaction

This roadmap is meant for organizations having problems such as

- dissatisfied customers

- too many defects in delivered products

- excessive maintenance costs

- finding defects in development projects too late in the project lifecycle

- insufficient control over the quality of products

4.2 Potential Users

This roadmap could be used by organizations that make products where poor quality results in high costs or dissatisfied customers. The success of the organizations using the Product roadmap is determined by the quality of the products made. Examples include

- organizations that develop standard products that are used by different customers at different locations

- organizations that develop components to be used in other systems

- organizations that develop systems which, if the systems malfunction during operation, have large effects on the customer, human life, or business continuity of companies

4.3 Process Areas

To achieve the goals and resolve the problems described above, the following process areas should be implemented.

Requirements Development
This process area will help analyze and establish customer, product, and product component requirements.

Requirements Management

This process area will help manage the requirements associated with a project's products and product components and identify inconsistencies between the requirements and the project's plans and work products.

Technical Solution

This process area will help select, design, develop, and implement solutions to requirements. Solutions, designs, and implementations encompass products, product components, and product-related life-cycle processes either singly or in combination as appropriate.

Configuration Management

This process area will help establish and maintain the integrity of selected work products by using configuration identification, configuration control, configuration status accounting, and configuration audits.

Verification

This process area will help ensure that selected work products meet specified requirements.

Process and Product Quality Assurance

This process area will help provide staff and management with objective insight into the processes being defined and deployed and associated work products.

4.4   Rationale for Inclusion or Exclusion of Process Areas

These six process areas will help to effectively develop products and improve the quality of products. They help organizations develop and manage requirements, guard the integrity of work products, and make sure that the work products meet all requirements. The addition of the Process and Product Quality Assurance process area ensures that improved processes are used.

The Validation process area is initially excluded due to its focus on building the right product. The Verification process area, however, is considered to initially be more important for successful product development, and is included in this roadmap accordingly.

4.5   Possible Next Steps

After finishing the roadmap, the organization can, depending on the problems and goals of the organization at that time, implement one of these roadmaps: Project, Process, or Measurement.

Implementing the Product Integration roadmap may not often be the best, first, or next choice, as the Product Integration roadmap is aimed at organizations that need a deeper focus on effective product integration, whereas the Product roadmap is aimed at organizations with a focus on broader aspects of development.

Organizations that have finished the Product roadmap can also deepen and improve their control over the development process by implementing the Product Integration and Validation process areas. In particular, the organization may choose the Validation process area when there is a high risk of building either unusable products or the wrong products. Implementing an Agile approach (e.g., SCRUM and XP; or FDD) may also help with these concerns, when access to and commit-

ment from customers is adequate, and when other project factors (e.g., an experienced team) favor an Agile approach.

Organizations can also define their own improvement path after finishing the Product roadmap by choosing those process areas that best meet their improvement goals at that time. Furthermore, it is a good option to further improve the process areas in this roadmap by bringing the selected process areas to higher capability levels.

5 Product Integration Roadmap

5.1 Purpose

The purpose of the Product Integration roadmap is to gain control of the integration process and ensure that the overall system meets its requirements. These organizations do not typically develop the components themselves; they instead assemble a system from acquired components. Organizations choosing the Product Integration roadmap typically want to

- gain control over the integration process, integration sequence, or the quality of supplied products
- become confident that individual components can be integrated into a cohesive system
- ensure that the overall system (the assembly) achieves its quality goals
- deliver products that fit the market needs
- select well-qualified suppliers

This roadmap is meant for organizations having problems such as

- bad coordination and cooperation between the various suppliers
- no control over the quality delivered by suppliers of work products
- no control over the integration process
- no insight into the extent to which the product meets the user needs in its intended environment

5.2 Potential Users

The Product Integration roadmap is intended for those organizations that do not perform the core development tasks (design, programming, unit test, etc.) for the main parts of the system, but integrate sub-products and components from other companies. These organizations are often called system integrators. The main tasks for these organizations are to

- specify the requirements for each supplier
- define the overall system architecture, including system interfaces as most important topic
- assemble components from suppliers
- make sure the total systems functions in accordance to the requirements
- perform program or portfolio management over different development projects
- ensure that the acquired components are of sufficient quality before they are delivered

5.3 Process Areas

To achieve the goals and resolve the problems described above, the following process areas should be implemented.

Requirements Development
This process area will help analyze customer, product, and product component requirements.

Configuration Management
This process area will help establish and maintain the integrity of work products (e.g., those of the project itself and supplier deliverables) using configuration identification, configuration control, configuration status accounting, and configuration audits.

Technical Solution
This process area will help design, develop, and implement solutions to requirements. Solutions, designs, and implementations encompass products, product components, and product-related life-cycle processes either singly or in combination as appropriate.

Product Integration
This process area will help assemble the product from the product components, ensure that the product, as integrated, functions properly, and deliver the product.

Supplier Agreement Management
This process area will help manage the acquisition of products from suppliers.

Validation
This process area will help demonstrate that a product or product component fulfills its intended use when placed in its intended environment.

5.4 Rationale for Inclusion or Exclusion of Process Areas

These six process areas provide basic control over the integration process. They support organizations in developing requirements, properly integrating the product, managing suppliers, and making sure that the end product fulfills its intended use.

The Technical Solution process area has been included here. It should be noted, however, that specific goals one and two are the most relevant to this roadmap. Specific goal three is mainly the focus of product component developers, who are external companies in this roadmap. Additionally, the Acquisition Technical Management process area (from CMMI-ACQ) might be included, depending on the extent to which the project needs to evaluate the technical solutions of its suppliers and their implementation prior to integration.

The Process and Product Quality Assurance process area is excluded, due to this roadmap's primary focus on managing suppliers. With supplier agreement management, system integrators assure the processes of their suppliers. Additionally, organizations should include the Process and Product Quality Assurance process area if the process area is important (relative to other risks) to assure their own processes.

The Requirements Management process area is excluded, due to this roadmap's focus on integration instead of creation. However, if the risk in tracing and managing the allocation of requirements to suppliers is high, this process area should be considered for inclusion in the roadmap.

The Verification process area is included to help ensure that selected work products of the project meet their specified requirements. Because product components are acquired from suppliers with-

in product integration, verification of those components is the responsibility of the suppliers. Through the Supplier Agreement Management process area (and the Acquisition Technical Management process area of CMMI-ACQ), adequate confidence in these verifications may be achieved. However, the organization should also verify its own work products, which is the focus of the Verification process area.

5.5 Possible Next Steps

After finishing the roadmap, the organization can implement these roadmaps: Project, Process, or Measurement. Implementing the Product roadmap would not be the first choice, as this roadmap is aimed at organizations with more of an internal focus on development; whereas the Product Integration roadmap is aimed at organizations that need to more deeply focus on product integration.

Organizations can also define their own improvement path after finishing the Product Integration roadmap by choosing those process areas that best meet their improvement goals at that time. Furthermore, it is a good option to further improve the process areas in this roadmap by bringing the selected process areas to higher capability levels.

Finally, as already stated, it may be appropriate to consider the Acquisition-specific process areas in CMMI-ACQ as the next or even as a supplement to the initial roadmap. The Acquisition-specific process areas may be preferred as an initial roadmap to the roadmap described above if the organization does not develop or integrate product components (i.e., if such is performed by its suppliers). But even for the situations described in sections 5.1 and 5.2, as already stated, the Acquisition-specific process areas of CMMI-ACQ contain additional best practices for managing the project and effectively managing and interfacing with suppliers. As the community gains more experience with CMMI-ACQ, we will be in a better position to know how best to tailor this roadmap to meet the needs of different organizational situations.

6 Process Roadmap

6.1 Purpose

The purpose of the Process roadmap is to develop a capability to define, implement, and improve an organization's set of processes. This can create a basis for process analysis and implementation of other process areas or roadmaps. Organizations choosing the Process roadmap typically want to

- define and analyze current processes
- improve processes based on insight into the processes and the organization's needs and priorities
- standardize the processes of the organization
- define a basic set of processes as a basis for continuous improvement
- establish a clear set of requirements for the quality system of the organization
- define processes that are compliant with applicable regulations, such as Sarbanes-Oxley, SAS 70, ISO 9000, or other regulations

This roadmap is meant for organizations that have problems such as

- a lack of clear understanding of their processes
- a lack of control over their processes
- difficulties handing work over to other or new employees
- limited adoption of defined processes
- employees not working together well within the organization
- a limited ability to identify problems in processes
- difficulty in improving processes

6.2 Potential Users

This roadmap is used by organizations using complex processes due to the size or complexity of the organization and its projects or products. The success of organizations that use the Process roadmap is determined by the degree to which such organizations are in control of their processes. Examples of these organizations are

- software factories
- organizations that build complex systems or that work in a complex environment
- organizations where many different disciplines contribute to development
- organizations where different suppliers work together
- organizations where competencies and the knowledge needed to perform tasks are not clear

6.3 Process Areas

To achieve the goals and resolve the problems described above, the following process areas should be implemented.

Organizational Process Focus
This process area will help plan, implement, and deploy organizational process improvements based on a thorough understanding of the current strengths and weaknesses of the organization's processes and process assets.

Organizational Process Definition
This process area will help establish and maintain a usable set of organizational process assets and work environment standards. Organizations in which many different disciplines contribute to development can use the Integrated Product and Process Development (IPPD)-specific goal of this process area. It helps these organizations achieve superior integrated team performance.

Measurement and Analysis
This process area will help develop and sustain a measurement capability that is used to support management information needs.

Causal Analysis and Resolution
This process area will help to identify causes of defects and other problems and take action to prevent them from occurring in the future.

Process and Product Quality Assurance
This process area will help provide staff and management with objective insight into the processes being defined and deployed and associated work products.

6.4 Rationale for Inclusion or Exclusion of Process Areas

These five process areas provide a basis for defining, implementing, and improving processes in the organization. Organizations improve their insight into their processes and insight into causes of problems. Process measurements provide the organization with the deeper understanding needed to improve its processes. The addition of Process and Product Quality Assurance ensures that improved processes are used.

The Decision Analysis and Resolution process area would be a good addition to this roadmap as it improves the evaluation of processes and the way the organization analyzes and makes decisions; however, it has not been included, because the selected process areas should be implemented first.

The Organizational Process Performance process area is not included in the roadmap because measurement and analysis needs to be implemented first. However, implementing this process area, as well as the Quantitative Project Management process area, can be considered a next step after the roadmap.

6.5 Possible Next Steps

The next step after finishing this roadmap depends on the organization's evaluation of its process strengths and weaknesses. If decisions are being made that require greater effectiveness, objectivi-

ty, control, and buy-in, the organization can implement the Decision Analysis and Resolution process area.

Another next step is to implement one of the other roadmaps. No other roadmap is inherently preferred over another after the Process roadmap has been implemented.

Organizations can also define their own improvement path after finishing the Process roadmap by choosing the process areas that best meet their improvement goals at that time. Furthermore, it is a good option to bring the selected process areas to higher capability levels, and therefore improve the process areas within this roadmap.

7 Measurement Roadmap

7.1 Purpose

The purpose of the Measurement roadmap is to identify, select, and measure improvements based on quantitative information. This roadmap can create a quantitative basis for process improvement and makes sure organizations select their improvements based on quantitative information. Organizations choosing the Measurement roadmap typically want to

- measure performance improvements quantitatively

- identify and select improvements based on quantitative information

- be able to quantitatively demonstrate the results of process improvements

- determine the most important key performance indicators of the organization

This roadmap is meant for organizations having problems such as

- a lack of quantitative management information necessary to understand the performance or the organization

- identifying and selecting improvement activities based on inadequate quantitative information

- a management team that remains skeptical of the contribution of process improvement to the performance of the organization

- a need to use quantitative information to show the added value of process improvements

- excessive measurement system error (one of the major challenges to successfully implementing the analyses described in the CMMI high maturity practices)

7.2 Potential Users

This roadmap is used by organizations that want to begin quantitatively managing their improvement. It can also be used in organizations where the management team is skeptical about the added value of process improvement. (This can be the case in any kind of organization.) Furthermore, it might be a good option to implement the measurement roadmap within the context of a broader improvement initiative, like Six Sigma.

7.3 Process Areas

To achieve the goals and resolve the problems described above, the following process areas should be implemented.

Measurement and Analysis
This process area will help develop and sustain a measurement capability that is used to support management information needs.

Organizational Process Focus
This process area will help plan, implement, and deploy organizational process improvements

based on a thorough understanding of the current strengths and weaknesses of the organization's processes and process assets.

Decision Analysis & Resolution
This process area will help analyze possible decisions using a formal process that evaluates identified alternatives against established criteria.

Process and Product Quality Assurance
This process area will help provide staff and management with objective insight into the processes being defined and deployed and associated work products.

7.4 Rationale for Inclusion or Exclusion of Process Areas

These four process areas provide a basis for defining, implementing, and using a measurement and decision-making program that helps organizations to improve processes based on quantitative information, and to show quantitatively the benefits of process improvements.

The Causal Analysis & Resolution process area can be a good addition to this roadmap. With Causal Analysis & Resolution, organizations select improvements based not only on quantitative information, but also on a causal analysis of selected defects and problems.

The Organizational Process Performance process area is not included in the roadmap because measurement and analysis needs to be implemented and in place for some time first. It can be a good addition to this roadmap if the roadmap has been implemented for some time (and if the Quantitative Project Management process area is also implemented concurrently).

7.5 Possible Next Steps

The next step after finishing this roadmap depends on the results achieved. Those processes that cause the most failure costs or show the most variation are the first to be addressed.

The next step can also be implementing a different roadmap. The decision as to which roadmap to select depends again on the results of the roadmap implementation.

Another possible next step is improving the analysis and improvement process by implementing the Causal Analysis & Resolution process area. (However, see the discussion in Section 7.4.)

Organizations can also define their own improvement path after finishing the Measurement roadmap by choosing those process areas that best meet their improvement goals at that time. Furthermore, it is a good option to further improve the process areas in this roadmap by bringing the selected process areas to higher capability levels.

Appendix A   Attendees of the SPIder Workshop

D. Bierhuizen—Medis Medical Imaging Systems
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G. Leroy—Prosource
J.R. van Mechelen—Compuware Nederland
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C. Michielsen—ITIB
N. van Mourik—SYSQA
E.M. Oostveen—Advanced
M.H.M. van Os—Sogeti
P. Oudhuis—Rijkswaterstaat
H. Philip—Ordina
K. Rassels—Allshare
G.A.S.M. van Schijndel—LogicaCMG Nederland
R. van Solingen—LogicaCMG Nederland
P. Verheij—Ordina
F.B. van Veen—Quality House
L.J.A.E. Vis—Student Vrije Universiteit Amsterdam
E. van der Vliet—LogicaCMG Nederland
P. van de Vorst—Ordina
J. de Vries—LogicaCMG Nederland
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CMMI "roadmaps"—which are a goal-driven approach to selecting and deploying relevant process areas from the CMMI-DEV model—can provide guidance and focus for effective CMMI adoption. The Dutch Software Process Improvement (SPIder) network convened a workshop in November 2006 to develop several CMMI roadmaps for the continuous representation, each with a specific set of improvement goals. These roadmaps combine the strengths of both the staged and the continuous re-presentations.

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